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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/652,348

08/29/2003

Franklin J. Wall JR.

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EXAMINER

WAGNER, JENNY

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/652,348	Applicant(s) WALL, FRANKLIN J.	
	Examiner JENNY L. WAGNER	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 24-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 24-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Request for Continued Examination

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 17, 2007, has been entered.

Claim Rejections – 35 USC §102(b)/103(a)

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 1, 3-7, 10, 16-17 and 24-27 are rejected under 35 U.S.C. 102(b), or alternatively under 103(a), as being anticipated/rendered obvious by Dolan (U.S.P.No. 4,566,170).

Regarding claim 1, Dolan discloses/teaches a structure comprising:

- a semiconductor light emitting device (*figure 2, 18*); and
- a substrate comprising a ceramic core (*figure 2, 12*) and at least one copper layer overlying the core (*figure 2, 14*), the at least one copper layer having a thickness of at least 4 mils (*col. 3, line 3*);
- wherein the semiconductor light emitting device is electrically connected to the at least one copper layer (*figure 2, 16*).

Though Dolan fails to explicitly teach that the substrate is configured to have a thermal conductivity of at least 24 W/mK, it is inherent that the substrate of Dolan has a thermal conductivity of at least 24 W/mK, because the materials of the substrate as disclosed by Dolan are the same materials claimed in the present application.

If, assuming *arguendo*, Dolan cannot be viewed as disclosing/teaching a substrate having a thermal conductivity of at least 24 W/mK, it would have been obvious to one having ordinary skill in the art at the time the invention was made to configure the substrate to have a thermal conductivity of at least 24 W/mk in order to optimize the substrate and dissipate a higher amount of heat from the LED through the substrate.

Regarding claim 3, Dolan further discloses/renderers obvious that the core comprises aluminum oxide (*col. 2, line 29*).

Regarding claim 4, Dolan further discloses/renders obvious that at least one lead is connected to the substrate (*figure 1, 24; the lead is electrically connected to the substrate through device 18*).

Regarding claim 5, Dolan further discloses/renders obvious at least one solder pad connected to the substrate (*figure 2, 20*).

Regarding claim 6, Dolan further discloses/renders obvious at least one terminated wire connected to the substrate (*figure 1, 24*).

Regarding claim 7, Dolan further discloses/renders obvious that the bond between the at least one copper layer and the core is a direct copper bond (*figure 2, 14; 14 is made of copper so the bond between the substrate and the copper pallet contains copper*).

Regarding claim 10, Dolan further discloses/renders obvious that the structure further comprises a second substrate disposed between the semiconductor light emitting device and the first substrate (*figure 2, 16; anything is considered a substrate absent an explicit definition, including an adhesive*).

Regarding claim 16, Dolan further discloses/renders obvious that the at least one copper layer is bonded to the core (*figure 2, 14*).

Regarding claim 17, the language, term, or phrase “wherein the at least one copper layer is bonded to the core by a process”, is directed towards the process of making a light emitting package structure. It is well settled that “product by process” limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. In re *Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, In re *Brown*, 173 USPQ 685; In re *Luck*, 177 USPQ 523; In re *Fessmann*, 180 USPQ 324; In re *Avery*, 186 USPQ 161; In re *Wethheim*, 191 USPQ 90

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(209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or otherwise. The above case law further makes clear that applicant has the burden of showing that the method language necessarily produces a structural difference. As such, the language “wherein the at least one copper layer is bonded to the core by a process” only requires a semiconductor light emitting device package, which does not distinguish the invention from Dolan, who teaches the structure as claimed.

Regarding claim 24, Dolan further discloses/renders obvious that the at least one copper layer is in direct contact with the ceramic core (*figure 2, 12, 14*).

Regarding claims 25-27, the Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP §2114. The recitation of “is configured to operate” does not distinguish the present invention over the prior art of Dolan who teaches the structure as claimed.

Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dolan (U.S.P.No. 4,566,170) as applied to claim 1 above, and in further view of Applicant's Admitted Prior Art (AAPA).

Regarding claim 2, Dolan fails to teach that the semiconductor light emitting device comprises a III-nitride light emitting layer. AAPA teaches the use of III-nitride materials used in LEDs (¶0002, line 5). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of AAPA in the invention of Dolan because, in paragraph 0002, line 3, AAPA states that these types of LEDs were capable of operation across the visible spectrum.

Regarding claim 8, Dolan fails to teach that the bond between the at least one copper layer and the core is an active metal braze. AAPA teaches the bond being an active metal braze (¶0019, line 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of AAPA in the invention of Dolan because, in paragraph 0019, line 1, AAPA states that this was known in the art.

Claims 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dolan (U.S.P.No. 4,566,170).

Regarding claim 9, Dolan teaches that the thickness of the copper slab is between 30 and 60 mils. While the thickness of the copper layer has been limited to about 24 mils, this is an obvious difference because the claimed range approaches the range taught by Dolan. See *In re Geisler* for the proposition that the references range renders the claimed range obvious because the referenced range allows for values slightly outside of the referenced range and thus the ranges overlap. 116 F.3d 1465, 1469-71, 43 USPQ2d 1362, 1365-66 (Fed. Cir. 1997).

Regarding claim 14, Dolan fails to teach a base connected to the substrate. It would have been obvious to one having ordinary skill in the art at the time the invention was made to connect the substrate of Dolan to a base in order for the device to be operable.

Claims 11-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dolan (U.S.P.No. 4,566,170) as applied to claim 1 above, and in further view of Whitworth et al. (U.S.P.No. 6,642,550).

Regarding claim 11, Dolan fails to teach that the second substrate comprises at least one metal bonding pad and an insulating layer. Whitworth et al. teaches an LED package having a bond pad (*figure 7, 760*) and an insulating layer (*figure 7, 730*). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Whitworth et al. in the invention of Dolan because, in col. 2, lines 60-61, Whitworth et al. states that this provided reflectivity.

Regarding claim 12, Dolan fails to teach that the insulating layer comprises one of aluminum nitride, aluminum oxide and silicon nitride. Whitworth et al. teaches that the insulating layer is made of silicon nitride (*col. 7, line 42*).

Regarding claim 13, Dolan fails to teach that the second substrate comprises a silicon integrated circuit. Whitworth et al. teaches a silicon integrated circuit as a second substrate (*figure 3, 380*).

Regarding claim 15, Dolan fails to teach a lens disposed over the semiconductor light emitting diode. Whitworth teaches a lens over an LED package (*figure 3, 350*). It would have been obvious to one having ordinary skill in the art at the time the invention was made to place a

lens over the LED package because it will improve the strength of the beam by focusing the light along a specific optical axis.

Response to Applicant's Remarks/Arguments

Applicant's arguments with respect to claims 7-8 and 24-26 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's argument that Dolan fails to teach a substrate having a thermal conductivity of at least 24 W/mK is not persuasive. Dolan teaches the same materials as the present application; therefore it is inherent that the substrate of Dolan has the same thermal properties as that of the present application. Further, though Dolan teaches a silver epoxy between the ceramic core and the copper layer of the substrate, the silver has a high enough conductivity to not reduce the total thermal conductivity of the entire substrate to a very low amount.

Applicant's argument that Dolan teaches contacts on the same side of the device and AAPA teaches contacts on opposite sides of the device is not persuasive. AAPA is not being used to teach what side the contacts are located; it is used to teach that III-nitride emitter layers are well-known in the art, as admitted to by the applicant. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Applicant's argument that Dolan does not teach a lead connected to the substrate is not persuasive. The lead is electrically connected to the substrate through the LED, as shown in the above rejection to claim 4.

Applicant's argument that Dolan does not teach a solder pad is not persuasive. Applicant has provided no argument or evidence as to why a silver epoxy cannot be considered a solder pad.

Applicant's argument that Dolan does not teach that the terminated wire is connected to the substrate is not persuasive. Dolan teaches a terminated wire electrically connected to the substrate through the LED. Further, it is proper for Examiner to consider 24 as both a lead and a terminated wire, as Applicant has not stated how these items are different.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNY L. WAGNER whose telephone number is (571)272-9792. The examiner can normally be reached on Monday through Thursday 7:00 a.m. to 5:30 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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2/21/08